AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions and listings of claims in the application:

1. (Currently amended) A method for embedding additional information into an input audio signal and outputting an output audio signal having the embedded additional information, the method comprising <u>the steps of</u>:

~~an orthogonal transform step of~~ orthogonally transforming the input audio signal to generate a plurality of orthogonal transform coefficients;

~~a shift and addition step of~~ damping and shifting a predetermined number of orthogonal transform coefficients selected from the plurality of orthogonal transform coefficients <u>by damping the predetermined number of orthogonal transform coefficients by a predetermined amount and shifting the predetermined number of orthogonal coefficients by a predetermined number of units</u> in the direction of the frequency axis<u>;</u>

~~and~~ adding the damped and shifted orthogonal transform coefficients to the original orthogonal transform coefficients to form an output audio signal, the added damped and shifted orthogonal coefficients comprising the embedded additional information; and

outputting the output audio signal having the embedded additional information.

2. (Currently amended) The method as claimed in claim 1, wherein ~~the orthogonal transform step~~ orthogonally transforming the input audio signal includes carrying out a modified discrete cosine transform (MDCT) of the audio signal to calculate MDCT coefficients, and wherein ~~the shift and addition step~~ damping and shifting the predetermined number of orthogonal transform coefficients includes damping and shifting the calculated MDCT coefficients in the direction of the frequency axis and adding the damped and shifted MDCT coefficients to the original MDCT coefficients, the added damped and shifted MDCT coefficients comprising the embedded additional information.

3. (Currently amended) The method as claimed in claim 1, wherein ~~the shift and addition step~~ damping and shifting the predetermined number of orthogonal transform coefficients includes adding the orthogonal transform coefficients shifted on the frequency axis to the original orthogonal transform coefficients so that a frequency masking condition and a temporal masking condition are met.

4. (Currently amended) The method as claimed in claim 1, wherein ~~the shift and addition step~~ damping and shifting the predetermined number of orthogonal transform coefficients includes carrying out the addition when the value obtained by adding the shifted orthogonal transform coefficients to the value of the original orthogonal transform coefficients is not higher than a predetermined value.

5. (Currently amended) The method as claimed in claim 1, wherein ~~the shift and addition step~~ damping and shifting the predetermined number of orthogonal transform coefficients includes prohibiting the shift and addition in accordance with the polarity of the value obtained by adding the shifted orthogonal transform coefficients to the value of the original orthogonal transform coefficients.

6. (Currently amended) The method as claimed in claim 1, wherein ~~the shift and addition step~~ damping and shifting the predetermined number of orthogonal transform coefficients includes carrying out the shift and addition when the input audio signal falls within a range from an upper limit value to a lower limit value.

7. (Currently amended) The method as claimed in claim 6, wherein ~~the shift and addition step~~ damping and shifting the predetermined number of orthogonal transform coefficients includes carrying out the shift and addition when the input audio signal falls within a range from an upper limit value to a lower limit value set on the basis of the human auditory characteristics.

8. (Currently amended) The method as claimed in claim 1, wherein ~~the shift and addition step~~ damping and shifting the predetermined number of orthogonal transform coefficients includes carrying out the shift and addition of the orthogonal transform coefficients within a predetermined frequency band.

9. (Currently amended) The method as claimed in claim 2, wherein ~~the shift and addition step~~ damping and shifting the predetermined number of orthogonal transform coefficients includes carrying out the shift and addition of the MDCT coefficients within a predetermined frequency band.

10. (Currently amended) The method as claimed in claim 1, wherein ~~the shift and addition step~~ damping and shifting the predetermined number of orthogonal transform coefficients includes dividing the frequency band of the input audio signal and carrying out shift and addition for each of the divided frequency bands.

11. (Currently amended) The method as claimed in claim 10, wherein ~~the shift and addition step~~ damping and shifting the predetermined number of orthogonal transform coefficients includes reversing the shifting direction of the divided adjacent frequency bands.

12. (Currently amended) The method as claimed in claim 1, further comprising ~~a step of~~ scrambling the output audio signal using a pseudo-random signal.

13. (Currently amended) The method as claimed in claim 2, wherein ~~the shift and addition step~~ damping and shifting the predetermined number of orthogonal transform coefficients includes shifting the MDCT coefficients toward the frequency-increasing side and adding the shifted MDCT coefficients to the original MDCT coefficients.

14. (Currently amended) The method as claimed in claim 13, wherein ~~at the shift and addition step,~~ damping and shifting the predetermined number of orthogonal transform coefficients includes increasing the frequency of the MDCT coefficients ~~is increased~~ by ((sampling frequency/number of samples of MDCT coefficient) x 2N) Hz, as the MDCT coefficients are shifted by 2N units (where N is a natural number).

15. (Currently amended) The method as claimed in claim 14, wherein ~~at the shift and addition step,~~ the amplitude of the MDCT coefficients is substantially equal to the amplitude of the input audio signal.

16. (Currently amended) The method as claimed in claim 2, wherein ~~the shift and addition step~~ damping and shifting the predetermined number of orthogonal transform coefficients includes shifting the MDCT coefficients toward the frequency-decreasing side and adding the shifted MDCT coefficients to the original MDCT coefficients.

17. (Currently amended) The method as claimed in claim 16, wherein ~~at the shift and addition step,~~ damping and shifting the predetermined number of orthogonal transform coefficients includes decreasing the frequency of the MDCT coefficients ~~is decreased~~ by ((sampling frequency/number of samples of MDCT coefficient) x 2N) Hz, as the MDCT coefficients is shifted by 2N units (where N is a natural number).

18. (Currently amended) The method as claimed in claim 17, wherein ~~at the shift and addition step,~~ the amplitude of the MDCT coefficients is substantially equal to the amplitude of the input audio signal.

19. (Currently amended) The method as claimed in claim 2, wherein ~~the shift and addition step~~ damping and shifting the predetermined number of orthogonal transform coefficients includes shifting the MDCT coefficients by 2N units (where N is a natural number).

20. (Currently amended) The method as claimed in claim 2, wherein ~~the shift and addition step~~ damping and shifting the predetermined number of orthogonal transform coefficients includes shifting the MDCT coefficient by 2N-1 units (where N is a natural number).

21. (Currently amended) The method as claimed in claim 2, wherein ~~the shift and addition step~~ damping and shifting the predetermined number of orthogonal transform coefficients includes adding the shifted MDCT coefficients within a critical band of a frequency masking area of the MDCT coefficients of the original input audio signal.

22. (Previously presented) The method as claimed in claim 1, wherein the embedded additional information comprises limitation information for prohibiting the transfer of the input audio signal.

23. (Previously presented) The method as claimed in claim 1, wherein the embedded additional information comprises limitation information for prohibiting recording of the input audio signal to a recording medium.

24. (Previously presented) The method as claimed in claim 1, wherein the embedded additional information comprises work data corresponding to the input audio signal.

25. (Currently amended) A device for embedding additional information into an input audio signal and outputting an output audio signal having the embedded additional information, the device comprising:

orthogonal transform means for orthogonally transforming the input audio signal to generate a plurality of orthogonal transform coefficients;

shift and addition means for damping and shifting a predetermined number of orthogonal transform coefficients selected from said plurality of orthogonal transform coefficients <u>by damping the predetermined number of orthogonal transform coefficients by a predetermined amount and shifting the predetermined number of orthogonal coefficients by a predetermined number of units</u> in the direction of the frequency axis and adding the damped and shifted orthogonal transform coefficients to the original orthogonal transform coefficients to form the output audio signal, the added damped and shifted orthogonal coefficients comprising the embedded additional information; and

output means for outputting the output audio signal having embedded additional information.

26. (Previously presented) The device as claimed in claim 25, wherein the orthogonal transform means carries out a modified discrete cosine transform (MDCT) of the audio signal to calculate MDCT coefficients, and wherein the shift and addition means damps and shifts the calculated MDCT coefficients in the direction of the frequency axis and adds the damped and shifted MDCT coefficients to the original MDCT coefficients, the added damped and shifted MDCT coefficients comprising the embedded additional information.

27. (Previously presented) The device as claimed in claim 25, wherein the shift and addition means adds the orthogonal transform coefficients shifted on the frequency axis to the original orthogonal transform coefficients so that a frequency masking condition and a temporal masking condition are met.

28. (Previously presented) The device as claimed in claim 25, wherein the shift and addition means carries out the addition when the value obtained by adding the shifted orthogonal transform coefficients to the value of the original orthogonal transform coefficients is not higher than a predetermined value.

29. (Previously presented) The device as claimed in claim 25, wherein the shift and addition means prohibits the shift and addition in accordance with the polarity

of the value obtained by adding the shifted orthogonal transform coefficients to the value of the original orthogonal transform coefficients.

30. (Previously presented) The device as claimed in claim 25, wherein the shift and addition means carries out the shift and addition when the input audio signal falls within a range from an upper limit value to a lower limit value.

31. (Previously presented) The device as claimed in claim 30, wherein the shift and addition means carries out the shift and addition when the input audio signal falls within a range from an upper limit value to a lower limit value set on the basis of the human auditory characteristics.

32. (Previously presented) The device as claimed in claim 25, wherein the shift and addition means carries out the shift and addition of the orthogonal transform coefficients within a predetermined frequency band.

33. (Previously presented) The device as claimed in claim 26, wherein the shift and addition means carries out the shift and addition of the MDCT coefficients within a predetermined frequency band.

34. (Previously presented) The device as claimed in claim 25, wherein the shift and addition means divides the frequency band of the input audio signal and carries out shift and addition for each of the divided frequency bands.

35. (Previously presented) The device as claimed in claim 34, wherein the shift and addition means reverses the shifting direction of the divided adjacent frequency bands.

36. (Previously presented) The device as claimed in claim 25, further comprising means for scrambling the output audio signal using a pseudo-random signal.

37. (Previously presented) The device as claimed in claim 26, wherein the shift and addition means shifts the MDCT coefficients toward the frequency-increasing side and adds the shifted MDCT coefficients to the original MDCT coefficients.

38. (Previously presented) The device as claimed in claim 37, wherein at the shift and addition means, the frequency of the MDCT coefficients is increased by ((sampling frequency/number of samples of MDCT coefficient) x 2N) Hz, as the MDCT coefficients are shifted by 2N units (where N is a natural number).

39. (Previously presented) The device as claimed in claim 38, wherein at the shift and addition means, the amplitude of the MDCT coefficients is substantially equal to the amplitude of the input audio signal.

40. (Previously presented) The device as claimed in claim 26, wherein the shift and addition means shifts the MDCT coefficients toward the frequency-decreasing side and adds the shifted MDCT coefficients to the original MDCT coefficients.

41. (Previously presented) The device as claimed in claim 40, wherein at the shift and addition means, the frequency of the MDCT coefficients is decreased by ((sampling frequency/number of samples of MDCT coefficient) x 2N) Hz, as the MDCT coefficients is shifted by 2N units (where N is a natural number).

42. (Previously presented) The device as claimed in claim 41, wherein at the shift and addition means, the amplitude of the MDCT coefficients is substantially equal to the amplitude of the input audio signal.

43. (Previously presented) The device as claimed in claim 26, wherein the shift and addition means shifts the MDCT coefficients by 2N units (where N is a natural number).

44. (Previously presented) The device as claimed in claim 26, wherein the shift and addition means shifts the MDCT coefficients by 2N-1 units (where N is a natural number).

45. (Previously presented) The device as claimed in claim 26, wherein the shift and addition means adds the shifted MDCT coefficients within a critical band of a frequency masking area of the MDCT coefficients of the original input audio signal.

46. (Previously presented) The device as claimed in claim 25, wherein the orthogonal transform means and the shift and addition means are integrally formed in a single circuit.

47. (Previously presented) The device as claimed in claim 25, wherein the embedded additional information comprises limitation information for prohibiting transfer of the input audio signal.

48. (Previously presented) The device as claimed in claim 25, wherein the embedded additional information is limitation information for prohibiting recording of the input audio signal to a recording medium.

49. (Previously presented) The device as claimed in claim 25, wherein the embedded additional information is work data corresponding to the input audio signal.

50. (Currently amended) A method for demodulating embedded additional information in a received audio signal, the embedded additional information generated by performing an inverse orthogonal transform on a predetermined number of a

plurality of orthogonal transform coefficients generated by orthogonally transforming the audio signal, the method comprising the steps of:

~~a receiving step of~~ receiving the audio signal having embedded additional information, the additional information embedded by damping and shifting a predetermined number of orthogonal transform coefficients selected from the plurality of orthogonal transform coefficients by damping the predetermined number of orthogonal transform coefficients by a predetermined amount and shifting the predetermined number of orthogonal coefficients by a predetermined number of units in the direction of the frequency axis and adding the damped and shifted orthogonal transform coefficients to the audio signal on the original frequency axis;

~~a demodulation step of~~ demodulating the embedded additional information on the basis of the polarity of the received audio signal at predetermined intervals on the frequency axis; and

~~an outputting step of~~ outputting the demodulated embedded additional information.

51. (Canceled)

52. (Currently amended) The method as claimed in claim 50, wherein the ~~receiving~~ step of receiving the audio signal includes receiving the audio signal having embedded additional information, the additional information embedded by damping and shifting in the direction of the frequency axis modified discrete cosine transform (MDCT)

coefficient calculated by performing an MDCT on the audio signal and adding the damped and shifted MDCT coefficient to the original MDCT coefficient.

53. (Currently amended) The method as claimed in claim 50, wherein the ~~receiving~~ step of receiving the audio signal includes receiving the audio signal having embedded additional information, the additional information embedded by AM modulation, and wherein the demodulation step includes demodulating the embedded additional information on the basis of the polarity of the received audio signal at predetermined intervals on the frequency axis.

54. (Currently amended) The method as claimed in claim 50, wherein the ~~receiving~~ step of receiving the audio signal includes receiving the audio signal having embedded additional information by FM modulation, and wherein the demodulation step includes demodulating the embedded additional information on the basis of the polarity of the received audio signal at predetermined intervals on the frequency axis.

55. (Currently amended) The method as claimed in claim 50, wherein the ~~receiving~~ step of receiving the audio signal includes receiving the audio signal having embedded additional information by Hilbert conversion, and wherein the demodulation step includes demodulating the embedded additional information on the basis of the polarity of the received audio signal at predetermined intervals on the frequency axis.

56. (Currently amended) The method as claimed in claim 50, wherein the ~~demodulation~~ step of demodulating includes demodulating the embedded additional information on the basis of the polarity of the received audio signal at predetermined intervals on the frequency axis within a predetermined frequency band.

57. (Previously presented) The method as claimed in claim 50, wherein the embedded additional information comprises control information for prohibiting transfer of the received audio signal.

58. (Previously presented) The method as claimed in claim 50, wherein the embedded additional information comprises control information for prohibiting recording of the received audio signal to a recording medium.

59. (Previously presented) The method as claimed in claim 50, wherein the embedded additional information comprises work data corresponding to the received audio signal.

60. (Currently amended) A device for demodulating embedded additional information in a received audio signal the embedded additional information generated by performing an inverse orthogonal transform on a predetermined number of orthogonal transform coefficients generated by orthogonally transforming the audio signal the device comprising:

receiving means for receiving the audio signal having embedded additional information, the additional information embedded by damping and shifting a predetermined number of orthogonal transform coefficients selected from the plurality of orthogonal transform coefficients <u>by damping the predetermined number of orthogonal transform coefficients by a predetermined amount and shifting the predetermined number of orthogonal coefficients by a predetermined number of units</u> in the direction of the frequency axis and adding the damped and shifted orthogonal transform coefficients to the audio signal on the original frequency axis;

demodulation means for demodulating the embedded additional information on the basis of the polarity of the received audio signal at predetermined intervals on the frequency axis; and

an outputting means for outputting the demodulated embedded additional information.

61. (Canceled)

62. (Previously presented) The device as claimed in claim 60, wherein the receiving means receives the audio signal having embedded additional information, the embedded additional information embedded by damping and shifting in the direction of the frequency axis a modified discrete cosine transform (MDCT) coefficient calculated by performing an MDCT on the audio signal and adding the damped and shifted MDCT coefficient to the original MDCT coefficient.

63. (Previously presented) The device as claimed in claim 60, wherein the receiving means receives receiving the audio signal having embedded information, the additional information embedded by AM modulation, and wherein the demodulation means demodulates the embedded additional information on the basis of the polarity of the received audio signal at predetermined intervals on the frequency axis.

64. (Previously presented) The device as claimed in claim 60, wherein the receiving means receives the audio signal having embedded additional information embedded by FM modulation, and wherein the demodulation means demodulates the embedded additional information on the basis of the polarity of the received audio signal at predetermined intervals on the frequency axis.

65. (Previously presented) The device as claimed in claim 60, wherein the receiving means receives the audio signal having embedded additional information embedded by Hilbert conversion, and wherein the demodulation means demodulates the embedded additional information the basis of the polarity of the received audio signal at predetermined intervals on the frequency axis.

66. (Previously presented) The device as claimed in claim 60, wherein the demodulation means demodulates the embedded additional information on the basis of the polarity of the received audio signal at predetermined intervals on the frequency axis within a predetermined frequency band of the received audio signal.

67. (Previously presented) The device as claimed in claim 60, wherein the embedded additional information comprises control information for prohibiting transfer of the received audio signal.

68. (Previously presented) The method as claimed in claim 60, wherein the embedded additional information comprises control information for prohibiting recording of the received audio signal to a recording medium.

69. (Previously presented) The method as claimed in claim 60, wherein the embedded additional information comprises work data corresponding to the received audio signal.